Liang et al., "Distribution and Cloning of Eukaryotic mRNAs by Means of Differential Display: Refinements and Optimization", *Nucleic Acids Research* 21(14):3269–3275 (1993).

Lu et al. (11 Apr. 1996) Nature, vol. 380, pp. 544-547.

Rosenberg et al., "Reversal of Diabetes by the Induction of Islet Cell Neogenesis", *Transplantation Proceedings* 24(3):1027-1028 (1992).

Rouquier et al., "Rat Pancreatic Stone Protein Messenger RNA" J. Biol. Chem., 266(2):786-791 (1991).

Lasserre et al., "A Novel Gene (HIP) Activated in Human Primary Liver Cancer", Cancer Research 52:5089-5095.

Terazono et al., "A Novel Gene Activated in Regenerating Islets", J. Biol. Chem., 263(5):211-2114 (1988).

Vinik et al., "Factors Controlling Pancreatic Islet Neogenesis", Yale Journal of Biology and Medicine 65:471-491 (1992).

Orelle et al., "Human Pancreatitis-associated Protein" J. Clin. Invest. 90:2284-2291 (1992).

Pittenger et al., "The Partial Isolation and Characterization of Ilotropin, a Novel Islet-Specific Growth Factor", Adv. Exp. Med. Biol. 321:123-130 (1992) Abstract.

Rosenberg, et al., "Trophic Stimulatin of the Ductular-Islet Cell Axis: A New Approach to the Treatment of Diabetes", *Pancreatic Islet Cell Regeneration and Growth*, edited by A. I. Vinik, Plenum Press, New York, 1992.

Primary Examiner—Robert A. Wax Assistant Examiner—Enrique D. Longton Attorney, Agent, or Firm—Banner & Witcoff, Ltd.

## [7] ABSTRACT

Removal of the nucleotide sequence encoding the signal peptide from the INGAP coding sequence allows cultured cells to express substantial amounts of INGAP activity. Previous attempts have provided only low yields of INGAP, possibly because the signal sequence of INGAP is toxic to the cells.

18 Claims, 2 Drawing Sheets